

## AMENDMENTS TO THE CLAIMS

1. **(Withdrawn)** A breast pump system, comprising:
  - a collapsible breast cup;
  - a container attached to the breast cup for collecting breast milk;
  - a vacuum line with a first and second end, the first end being attached to the breast cup;
  - a pump having an input and an output, the input being attached to the second end of the vacuum line for drawing a vacuum in the breast cup, causing milk to be extracted from the breast; and
  - a biological filter having an input and an output connected between the breast cup and the input to the pump in the vacuum line, for preventing contamination between the pump and the breast cup.
2. **(Withdrawn)** The breast pump system of claim 1 wherein the breast cup is made of silicone material.
3. **(Withdrawn)** The breast pump system of claim 1 wherein the container further comprises a cap threadable to the top of the container.
4. **(Withdrawn)** The breast pump system of claim 1 wherein the pump is piston driven by a variable speed DC motor.
5. **(Withdrawn)** The breast pump system of claim 1 wherein the biological filter is a 60 mm, 1.0 micron filter.
6. **(Withdrawn)** The breast pump system of claim 1 further comprising a second filter in the vacuum line between the biological filter and the input of the pump.
7. **(Withdrawn)** The breast pump system of claim 6 further comprising:

a vacuum line connected between the input to the second filter and the out put of the pump; and

a valve in the vacuum line between the second filter and the pump output.

8. **(Withdrawn)** The breast pump system of claim 1 further comprising a third filter connected to the output of the pump.

9. **(Withdrawn)** The breast pump system of claim 1 further comprising a vacuum sensor connected to the vacuum line for monitoring the vacuum level in the line.

10 **(Withdrawn)** The breast pump system of claim 9 further comprising a control circuit response to the vacuum level sensed by the vacuum sensor for regulating the speed of the pump.

11. **(Withdrawn)** The breast pump system of claim 10 further comprising a manual control connected to the control circuit for adjusting the cycling of the pump.

12. **(Withdrawn)** The breast pump system of claim 1 wherein the biological filter is connected to the input of the pump by a push in connection.

13. **(Withdrawn)** The breast pump system of claim 12 wherein the push in connection comprises:

a female channel connected to one end of a vacuum line attached to the input of the pump; and

a male extension attached to the output of the biological filter, the extension sized to fit into the female channel.

14. **(Withdrawn)** The breast pump system of claim 13 wherein the male extension further comprises:

a pair of sealing O rings displaced along the length of the male extension, wherein one O ring has a greater thickness than the other.

15. **(Withdrawn)** The breast pump system of claim 13 wherein the male extension is tapered along its length from a larger diameter, where it attaches to the filter, to a smaller diameter.

16. **(Withdrawn)** A breast pump system comprising:

a flexible breast cup;

a container attached to the breast cup for collecting breast milk;

a vacuum line with a first and second end, the first end being attached to the flexible breast cup;

a pump having an input and an output, the input being attached to the second end of the vacuum line for drawing a vacuum in the breast cup causing milk to be extracted from the breast; and

a vacuum control circuit for controlling the length of time that a vacuum is drawn in the breast cup and the length of time that no vacuum is drawn in the breast cup.

17. **(Withdrawn)** The breast pump system of claim 16 further comprising a biological filter having an input and an output connected into the vacuum line between the breast cup and the input to the pump for preventing contamination between the pump and the breast cup.

18. **(Withdrawn)** The breast pump system of claim 16 wherein the pump is a piston pump driven by a variable speed DC motor.

19. **(Withdrawn)** The breast pump system of claim 16 further comprising a vacuum sensor for monitoring the vacuum in the line, the vacuum control circuit being

responsive to the vacuum sensor.

20. **(Withdrawn)** The breast pump system of claim 16 further comprising:

a vacuum line connected between the input to the pump and the output to the pump; and

a valve in the vacuum line between the pump input and output;

the vacuum control circuit opening and closing the valve to control the length of time that a vacuum is drawn and the length of time that no vacuum is drawn.

21. **(Withdrawn)** A breast pump comprising:

a pump having an input and an output being connected for applying pressure to a breast in a breast cup; and

a control circuit for controlling the length of time that continuous pressure is applied to a breast in a breast cup and the length of time that no pressure is applied to the breast in the breast cup.

22. - 42. Cancelled

1     **43. (New)** A breast cup assembly comprising:  
2             a bottle attachment end for connecting to a vacuum source;  
3             a large open end opposite the bottle attachment end for accepting a woman's  
4     breast;  
5             a holder comprising:  
6                 a small end residing proximal to the bottle attachment end of the breast  
7     cup assembly;  
8                 a large end opposite the small end and having a larger diameter than the  
9     small end; and  
10                a center portion connecting the small end to the large end, the center  
11     portion having at least one air path passing radially through the holder to allow free  
12     movement inside the holder;  
13                a single layer breast cup made of biocompatible material and supported inside  
14     the holder, the breast cup having an inner surface exposed to the vacuum source and  
15     an outer surface exposed to atmospheric pressure, the breast cup sequentially  
16     comprising;  
17                a connecting portion residing proximal to the bottle attachment end of the  
18     breast cup assembly and supported by the small end of the holder; the connecting  
19     portion for connecting to the vacuum source;  
20                a cylindrical middle area formed contiguous to the connecting portion, and  
21     configured for receiving a teat of a breast and having a first thickness; and  
22                a cone shaped portion formed contiguous to the middle area, and  
23     configured for receiving a portion of the breast, the cone shaped portion increasing in  
24     diameter away from the mid portion to the large open end, and supported proximal to  
25     the large open end by the large end of the holder, the cone shaped portion having a  
26     second thickness,  
27                wherein the second thickness is less than the first thickness so that upon  
28     application of vacuum to the connecting portion the cone shaped portion distorts before  
29     the mid portion distorts.

1     **44. (New)**   The breast cup assembly of Claim 43, wherein;  
2               the connecting portion of the breast cup includes a fastening wedge and the  
3     small end of the holder includes a complementary ridge; and  
4               the connecting portion of the breast cup is insertable into the small end of the  
5     holder so that the fastening wedge catches on the complementary ridge to retain the  
6     breast cup in the holder.

**45. (New)**   The breast cup assembly of Claim 44, wherein;  
              the fastening wedge is frusto conical in shape decreasing in diameter toward the  
front of the breast cup and having a rearward facing wedge face extending inward; and  
              the complementary ridge includes a forward facing ridge face for cooperation  
with the wedge face to retain the breast cup in the holder.

1     **46. (New)**   The breast cup assembly of Claim 43, wherein:  
2               the center portion of the holder comprises at least two ribs connecting the small  
3     end to the large end; and  
4               gaps between the ribs provide the air path passing through the holder to allow  
5     free movement of the breast cup inside the holder.

**47. (New)**   The breast cup assembly of Claim 46, wherein the cone shaped portion of  
the breast cup includes a thickened ridge for adding stability to the large open end of  
the breast cup assembly and a platform providing a stable base for the large end of the  
holder.

1     **48. (New)**   The breast cup assembly of Claim 47, wherein the entire inner surfaces of  
2     the middle area of the breast cup and the cone shaped portion of the breast cup are  
3     exposed to the vacuum source and the entire outer surfaces of the middle area of the  
4     breast cup and the cone shaped portion of the breast cup, with the exception the  
5     platform of the cone shaped portion, are exposed to the atmospheric pressure.

49. **(New)** The breast cup assembly of Claim 46, further including a smooth radius transitioning from the cylindrical middle area to the cone shaped portion.

50. **(New)** The breast cup assembly of Claim 43, wherein the connecting portion and the middle area of the breast cup comprise approximately 2/3 of the total length of the breast cup and the cone shaped portion comprises approximately 1/3 of the total length of the breast cup.

51. **(New)** The breast cup assembly of Claim 43, wherein the first thickness of the breast cup is about 0.175 inches.

52. **(New)** The breast cup assembly of Claim 43, wherein the cylindrical middle area is about one inch in diameter.

53. **(New)** The breast cup assembly of Claim 52, wherein the large open end is about 3.5 inches in diameter.

54. **(New)** The breast cup assembly of Claim 43, wherein the breast cup is made from silicone rubber.

1 55. **(New)** A breast cup assembly comprising:

2 a bottle attachment end for connecting to a vacuum source;

3 a large open end opposite the bottle attachment end for accepting a woman's  
4 breast;

5 a holder comprising:

6 a round cross-section small end residing proximal to the bottle attachment  
7 end of the breast cup assembly and including an internal passage with a forward facing  
8 ridge face;

9 a round cross-section large end opposite the small end and having a  
10 larger diameter than the small end; and

11 a center portion connecting the small end to the large end, the center  
12 portion having at least one air path passing radially through the holder to allow free  
13 movement inside the holder;

14 a single layer breast cup made of biocompatible material and supported inside  
15 the holder, the breast cup having an inner surface exposed to the vacuum source and  
16 an outer surface exposed to atmospheric pressure, the breast cup sequentially  
17 comprising;

18 a connecting portion residing proximal to the bottle attachment end of the  
19 breast cup assembly and supported by the small end of the holder and including a  
20 fastening wedge tapering small to the front of the breast cup and including a rearward  
21 facing wedge face; the connecting portion for connecting to the vacuum source;

22 a cylindrical middle area formed adjacent to the connecting portion, and  
23 configured for receiving a teat of a breast; and

24 a cone shaped portion formed adjacent to the middle area, and configured  
25 for receiving a portion of the breast, the cone shaped portion increasing in diameter  
26 away from the mid portion to the large open end, and supported proximal to the large  
27 open end by the large end of the holder,

28 wherein the breast cup assembly is formed by inserting the breast cup into the  
29 holder wherein the fastening wedge catches on the complementary ridge to retain the  
30 breast cup in the holder.

1 56. **(New)** The breast cup assembly of Claim 55, wherein;

2 the fastening wedge is frusto conical in shape decreasing in diameter toward the  
3 front of the breast cup and having a rearward facing wedge face extending inward; and

4 the complementary ridge includes a forward facing ridge face for cooperation  
5 with the wedge face.

1 57. **(New)** The breast cup assembly of Claim 56, wherein:

2 the center portion of the holder comprises at least two ribs connecting the small  
3 end to the large end; and



4 gaps between the ribs provide the air path passing through the holder to allow  
5 free movement of the breast cup inside the holder.

58. (New) The breast cup assembly of Claim 55, wherein the cone shaped portion of the breast cup includes a thickened ridge for adding stability to the large open end of the breast cup assembly and a platform providing a stable base for the large end of the holder.

1 59. (New) The breast cup assembly of Claim 55, wherein;  
2 the cylindrical middle area has a first thickness;  
3 the cone shaped portion has a second thickness; and  
4 the second thickness is less than the first thickness so that upon application of  
5 vacuum to the connecting portion the cone shaped portion distorts before the mid  
6 portion distorts.

1 60. (New) A breast cup assembly comprising:  
2 a bottle attachment end for connecting to a vacuum source;  
3 a large open end opposite the bottle attachment end for accepting a woman's  
4 breast;  
5 a holder comprising:  
6 a round cross-section small end residing proximal to the bottle attachment  
7 end of the breast cup assembly;  
8 a round cross-section large end opposite the small end and having a  
9 larger diameter than the small end; and  
10 a center portion connecting the small end to the large end, the center  
11 portion having at least one air path passing radially through the holder to allow free  
12 movement inside the holder;  
13 a single layer breast cup made of biocompatible material and supported inside  
14 the holder, the breast cup having an inner surface exposed to the vacuum source and  
15 an outer surface exposed to atmospheric pressure, the breast cup sequentially

comprising;

a connecting portion residing proximal to the bottle attachment end of the breast cup assembly and insertable into the small end of the holder, wherein the connection portion includes an interior surface for receiving a vacuum source and an exterior surface for cooperation with the small end of the holder wherein insertion of the vacuum source into the connecting portion biases the exterior surface of the connecting portion against the small end of the holder to hold the breast cup in the holder;

a cylindrical middle area formed adjacent to the connecting portion, and configured for receiving a teat of a breast; and

a cone shaped portion formed adjacent to the middle area, and configured for receiving a portion of the breast, the cone shaped portion increasing in diameter away from the mid portion to the large open end, and supported proximal to the large open end by the large end of the holder,

wherein the breast cup assembly is formed by inserting the breast cup into the holder wherein the fastening wedge catches on the complementary ridge to retain the breast cup in the holder.

61. **(New)** The breast cup assembly of Claim 60, wherein;

the connecting portion of the breast cup includes a fastening wedge and the small end of the holder includes a complementary ridge; and

the connecting portion of the breast cup is insertable into the small end of the holder so that the fastening wedge catches on the complementary ridge to retain the breast cup in the holder.

1     62. **(New)**   The breast cup assembly of Claim 60, wherein;  
2             the cylindrical middle area has a first thickness;  
3             the cone shaped portion has a second thickness; and  
4             the second thickness is less than the first thickness so that upon application of  
5 vacuum to the connecting portion the cone shaped portion distorts before the mid  
6 portion distorts.

1     63. **(New)**   The breast cup assembly of Claim 60, wherein:  
2             the cone shaped portion of the breast cup includes a thickened ridge for adding  
3 stability to the large open end of the breast cup assembly and a platform providing a  
4 stable base for the large end of the holder; and  
5             the entire inner surfaces of the middle area of the breast cup and the cone  
6 shaped portion of the breast cup are exposed to the vacuum source and the entire  
7 outer surfaces of the middle area of the breast cup and the cone shaped portion of the  
8 breast cup, with the exception the platform of the cone shaped portion, are exposed to  
9 the atmospheric pressure.